Space Weather Forecast

Issued on Saturday, 18 December 2021 at 12:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Daily chance of Moderate-class flares, potentially increasing over the UTC weekend. Chance of high speed stream from a coronal hole by day 4.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar Activity has been Low in the past 24 hours, with only a common-class flare, originating from the sunspot region in the southeast of the sun. There are currently six numbered sunspot regions on the visible disc, with the southeastern quadrant seeing the most complex of sunspot regions and strongly polarised. However, rates of growth appear to have slowed down over the past 24 hours. relative to previous days. No Earth-directed Coronal Mass Ejections (CMEs) were observed in available satellite imagery.

Solar Wind / Geomagnetic Activity: Solar winds, as measured by the DSCOVR satellite at L1 have been at background levels, after exiting from a high speed stream thought to be from a coronal hole. Solar wind speeds have ranged between 380km/s to 330km/s during the past 24 hours. The interplanetary magnetic field (IMF) and the all important north-south component (Bz) were weak throughout the period. The net result of the above solar wind measures was Quiet geomagnetic activity during the last 24 hours.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to continue mainly low, with the Chance (30%) of further isolated Moderate-class flares, and a slight (5%) chance of a strong-class flare. Flare probabilities may increase a little in the coming days (to 40 and 10% respectively), with further potential active regions likely to rotate around the east limb and none leaving over the west. The chances of common class flares are 90% throughout.

Solar Wind / Geomagnetic Activity: No CMEs feature in the current forecast period. Earth has recently exited a high speed stream from a coronal hole to leave quiet geomagnetic conditions. There is now thought to be a chance of some influence from a second small coronal hole later in the UTC weekend, probably peaking below Minor Storm G1 before reverting to quiet once again. Finally, there is a possible late peak in activity should a third, larger, coronal hole arrive on day 4 (21 Dec), signposted by a 5% slight chance of G1/Minor Storm.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there a slight increasing risk of achieving S1 in any significant flares as the sunspot regions transit 13 degrees a day towards the western solar hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	40	40	40
Very Active	R3 to R5 X	No	5	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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